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The Belles Group, P.C.
1608 Walnut Street, Suite 1302
Philadelphia, PA 19103

EXAMINER

BURKE, SEAN P

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte KRISHNA P. SINGH

Appeal 2015-002144
Application 12/769,622
Technology Center 3600

Before LYNNE H. BROWNE, THOMAS F. SMEGAL, and
JEFFREY A. STEPHENS, *Administrative Patent Judges*.

STEPHENS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant¹ seeks our review under 35 U.S.C. § 134(a) from the Examiner's Final Office Action ("Final Act.") rejecting claims 1–11, 13, and 21–33, which are all the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

¹ The real party in interest is identified as Holtec International, Inc. App. Br. 2.

Claimed Subject Matter

Claims 1 and 26, reproduced below, illustrate the claimed subject matter.

1. A thermally conductive cask comprising:
a cylindrical body comprising:
an inner shell forming a cavity for receiving high level radioactive waste and having a longitudinal axis;
an intermediate shell comprising an inner layer and an outer layer clad to the inner layer, the inner layer constructed of a first material having a first thermal conductivity and the outer layer constructed of a second material having a second thermal conductivity that is greater than the first thermal conductivity, the intermediate shell circumferentially surrounding the inner shell in a concentric manner so as to form a first annular gap between the inner layer of the intermediate shell and the inner shell;
a first set of radial fins located within the first annular gap and connected to the inner shell and the intermediate shell;
a gamma shielding material filling the first annular gap;
an outer shell circumferentially surrounding the intermediate shell in a concentric manner so as to form a second annular gap between the outer layer of the intermediate shell and the outer shell, the outer shell constructed of the second material;
a second set of radial fins located within the second annular gap and connected to the outer layer of the intermediate shell and the outer shell, the second set of radial fins constructed of the second material; and
a neutron shielding material disposed within the second annular gap;
a lid connected to a top end of the cylindrical body and enclosing a top end of the cavity; and
a base connected to a bottom end of the cylindrical body and enclosing a bottom end of the cavity.

26. A thermally conductive cask comprising:
- a gamma shielding cylindrical body forming a cavity for receiving high level radioactive waste and having an outer surface formed of a first material having a first thermal conductivity;
 - a neutron shielding cylindrical body surrounding the gamma shielding cylindrical body, the neutron shielding cylindrical body comprising:
 - a first shell forming an inner surface of the neutron shielding cylindrical body;
 - a second shell concentrically surrounding the first shell so that an annular gap exists between the first and second shells;
 - a set of connectors disposed within the annular gap and connected to the first and second shells;
 - a neutron absorbing material filling the annular gap;
 - and
 - wherein the first shell, the second shell, and the connectors are constructed of a second material having a second thermal conductivity that is greater than the first thermal conductivity;
 - and
 - wherein the first shell is clad to the outer surface of the gamma shielding cylindrical body.

Rejections²

1. Claims 1, 2, 7–11, 13, 26–29, and 33 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Anderson et al. (US 3,780,306, issued Dec. 18, 1973). Final Act. 6–12.
2. Claims 3 and 4 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Anderson and Mallory (US 4,806,771, issued Feb. 21, 1989). Final Act. 12–13.

² In the Answer, the Examiner withdraws the rejection of claim 31 under 35 U.S.C. § 112, second paragraph. Ans. 2.

3. Claims 5, 6, 14–19, and 21–24 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Anderson and Kok et al. (US 4,663,533, issued May 5, 1987). Final Act. 13–20.

4. Claim 12 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Anderson and Tamaki (US 2005/0224729 A1, published Oct. 13, 2005). Final Act. 20–21.

5. Claims 20 and 25 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Anderson, Kok, and Singh et al. (US 2008/0031396 A1, published Feb. 7, 2008) (hereinafter, “Singh ’396”). Final Act. 22–23.

6. Claims 30 and 32 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Anderson and Knackstedt et al. (US 4,339,411, issued July 13, 1982). Final Act. 23.

7. Claim 31 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Anderson, Knackstedt, and Singh (US 2006/0251201 A1, published Nov. 9, 2006) (hereinafter, “Singh ’201”). Final Act. 24.

ANALYSIS

Claims 1–11, 13, 21–25, 30, 31, and 33

Claim 1 recites “an intermediate shell comprising an inner layer and an outer layer clad to the inner layer, the inner layer constructed of a first material having a first thermal conductivity and the outer layer constructed of a second material having a second thermal conductivity that is greater than the first thermal conductivity.” The Examiner finds Anderson’s annular ring 72 is the claimed “intermediate shell” (Final Act. 6 (citing Anderson Fig. 5)), and that it would have been obvious to make it a bi-metallic layer (Final Act. 7). In particular, the Examiner finds the use of a bi-metallic layer

is well known in the art for providing a bridge between dissimilar metals and that Anderson teaches a bi-metallic substrate, albeit in a different location. Final Act. 7.

We agree with Appellant's argument (*see* App. Br. 15) that the Examiner has not presented sufficient findings or reasoning as to why one of ordinary skill in the art would have modified Anderson's intermediate shell to be formed of two layers. Appellant points out that Anderson's annular ring 72 and conductor bars 70, 74 attached to either side of the ring are all made of the same material, namely copper. *Id.* at 16 (citing Anderson col. 4, ll. 25–32). Appellant argues “there is absolutely no need for one of skill in the art to modify the annular ring 72 to be a bi-metallic layer so as to be ‘a bridge between dissimilar materials’ because there is no material dissimilarity between the conductor bars 70, 74.” *Id.* Because there is no material dissimilarity, we agree with Appellant that the Examiner's finding that a bi-metallic layer is known for providing a bridge between dissimilar metals does not provide sufficient reason for one of ordinary skill in the art to make the proposed modification.

The Examiner relies on the rationale expressed in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007), that “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” Final Act. 7; Ans. 24. Here, however, modifying Anderson's annular ring 72 to be a bi-metallic layer does not result in a bi-metallic layer performing the known function of providing a bridge between dissimilar metals because annular ring 72 is not connected to dissimilar metals. Thus, additional modifications would be

necessary, and the Examiner has provided no reason for modifying Anderson to employ dissimilar metals surrounding annular ring 72.

The Examiner also concludes that the difference between Anderson and claim 1 is merely the arrangement of parts, and that the motivation to modify Anderson is the same as the motivation to produce Appellant's invention, namely to provide a cask for storing nuclear waste. Ans. 24. Although shifting the position of a particular element in the prior art may be an obvious modification, a reason for making the change should be identified when the change modifies the operation of the device. *Cf. In re Japikse*, 181 F.2d 1019, 1023 (CCPA 1950) (finding no error in the conclusion that "there would be no invention in shifting the starting switch disclosed by [the prior art] to a different position since the operation of the device would not thereby be modified"). Each of the layers in Appellant's claim 1 and in the Anderson device perform specific functions involving heat dissipation or radiation shielding. We are persuaded that modifying Anderson's annular ring 72 to be bi-metallic like the outer layer would require more than physically accommodating the layer, and would require a re-design of how the material would fit into the overall design to conduct heat or shield radiation. Accordingly, we are not persuaded that the claim "simply arranges old elements with each performing the same function it had been known to perform," *KSR* 550 U.S. at 417 (internal quotation omitted), and, on this record, we are not persuaded one of ordinary skill in the art would have modified Anderson's annular ring 72 to be comprised of two layers formed of different materials as recited in claim 1.

In view of the foregoing, and on the record before us, we do not sustain the rejection of claim 1 under 35 U.S.C. § 103(a) as unpatentable over Anderson.

Independent claim 21 similarly recites “an intermediate shell comprising an inner steel layer and an outer aluminum layer clad to the inner steel layer.” Independent claim 33 recites a gamma shielding cylindrical body with “an outer surface formed of a first material having a first thermal conductivity,” as well as a layer of a neutron shielding cylindrical body “formed of a second material having a second thermal conductivity . . . wherein the layer is clad to the outer surface of the gamma shielding cylindrical body.” Because the rejections of independent claims 21 and 33, and dependent claims 2–11, 13, 22–25, 30, and 31 all rely on the Examiner’s rearrangement of the bi-metallic layer taught in Anderson, we also do not sustain the rejections of claims 2–11, 13, 21–25, 30, 31, and 33.³

Claims 26–29 and 32

Claim 26 recites a gamma shielding cylindrical body with “an outer surface formed of a first material having a first thermal conductivity,” and recites that a first shell, second shell, and connectors of a neutron shielding body “are constructed of a second material having a second thermal conductivity that is greater than the first thermal conductivity.” Claim 26 further recites that “the first shell is clad to the outer surface of the gamma shielding cylindrical body.”

³ Because this issue is dispositive as to claims 1–11, 13, 21–25, 30, 31, and 33, we need not reach additional issues raised by Appellant’s arguments as to these claims.

Unlike with claim 1, the Examiner's rejection of claim 26 does not expressly rely on modifying or rearranging Anderson's cylindrical layers. *See* Final Act. 10–11. Rather, the Examiner appears to find that Anderson's intermediate shell 52, shown in Figures 4 and 5,⁴ is both the claimed “outer surface” of the gamma shielding body and the “first shell” of the neutron shielding body, which is formed of a different material. *See* Final Act. 10. Absent sufficient findings or reasoning for modifying Anderson's intermediate shell 52 to be a bi-metallic layer, we agree with Appellant that Anderson's intermediate shell 52 cannot be both the “outer surface” and the “first shell” recited in claim 26, which are formed of different materials. App. Br. 18–19.

Appellant does not challenge the Examiner's finding (Final Act. 11) that Figure 5 of Anderson shows intermediate shell 52 and gamma radiation shielding means 56 can be considered a first shell clad to the outer surface of a gamma shielding cylindrical body, but this finding is inconsistent with the Examiner's finding above that Anderson's intermediate shell 52 is both the first shell and the outer surface of the gamma shielding body. The Examiner's clarification in the Answer that the “Examiner construes the ‘first shell’ of claim 26 to encompass the region external to the gamma shield, nominally the region between ref. 52 and the unlabeled layer external to ref. 56” (Ans. 27) is not sufficiently clear to remedy the inconsistency.⁵

⁴ As the Examiner points out in the rejection of claim 1, reference numeral 52 in Figure 5 of Anderson “is improperly labeled and should refer to the layer surrounding ref. 56,” as can be seen in Figure 4. Final Act. 6 (citing Anderson col. 4, ll. 1–4).

⁵ As shown in Figure 4 of Anderson, reference 52 is external to reference 56, and it is unclear which “unlabeled layer” the Examiner identifies. If the Examiner's reference to the “unlabeled layer external to ref. 56” is meant to

In view of the foregoing, and on the record before us, we do not sustain the rejection of claim 26 as obvious over Anderson. For the same reasons, we do not sustain the rejections of dependent claims 27–29 and 32, which depend from claim 26.

DECISION

We reverse the Examiner’s decision to reject claims 1–11, 13, and 21–33.

REVERSED

refer to intermediate shell 52, which is not labeled correctly in Figure 5 of Anderson, then perhaps the citation of “ref. 52” is meant to refer to inner shell 50. These findings, however, are not consistent with the Examiner’s rejection presented in the Final Action and, standing alone, cannot remedy the deficiencies noted.